

Military Vehicle Intelligence: Next Generation Electrical Architecture Infrared Microbolometer Night Vision Camera

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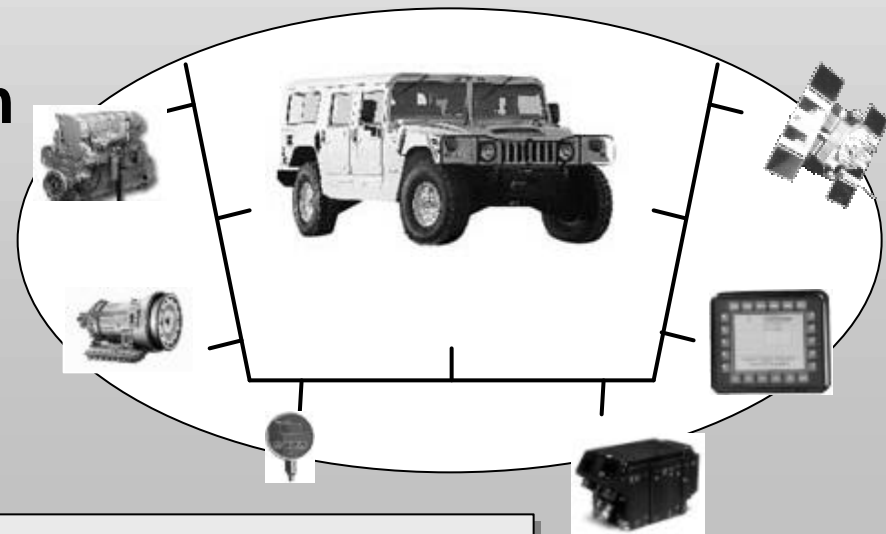
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Next Generation Electrical Architecture (NGEA)

- **Purpose** - To develop dual use electronic architecture that will realize greater functionality, reduced maintenance costs, and reduced development costs
- **System Engineering Team**
 - NAC
 - Oakland University
 - DaimlerChrysler
 - Lear Corporation
 - Eaton Corporation



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NGEA Description

- **Phase 1:** System Design - Utilize the System Engineering Process to develop a feasible NGEA design specification.
- **Phase 2:** Subsystem level design specification and on-vehicle diagnostic fault-over demonstration.
- **Phase 3:** Prototype development and complete System/Component specification. Tech demonstrator of finished NGEA on Jeep and HMMWV platforms.

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NGEA Status

- Performance
 - Design specification complete to system level
 - Diagnostic fault-over demo complete
 - **Successfully displayed at Convergence conference Oct 1999 and 2001 SAE International symposium**
- Cost
 - **NAC/Industry Partners: \$2.285 M/\$2.265M**

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NGEA Schedule

MILESTONES	FY00	FY01	FY02
Component Requirements			
Component Design			
First Demo	X		
Subsystem HFE			
Subsystem Refinement			
Final Subsystem Demo			X
Final System Demo			X
Reports	X X X X	X X	X X

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Deliverables and ROI

- **NGEA design specification and two demonstration vehicles - HMMWV and 1999 Jeep Cherokee**
- **Plug and play infrastructure for Army Trucks**
- **Reduction in O&S and commercial warranty cost (target \$300/vehicle)**
- **Reduction in development costs (target \$12M)**
- **No increase in piece costs**

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NGEA Jeep at Convergence Show

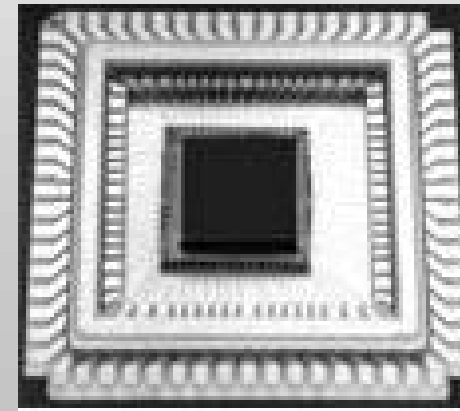


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Infrared Microbolometer Night Vision Camera

- NAC partnership with BAE Systems, Inc.
- Purpose
 - To Demonstrate low cost microbolometer thermal imaging device on NAC technology vehicle test bed demonstrator to validate low cost alternative to existing night vision devices



Microbolometer Focal Plane Array

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Project Description

- DUAP With BAE Systems (formerly Lockheed Martin) total value \$2.8 M
- Objective - to design, develop, and fabricate a low power miniaturized uncooled microbolometer based thermal sensor
- Original program duration 21 months - 01/98 to 10/99

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Technology Description

- Low power consumption (3.2 watts)
- Small space claim (3.5 in cube)
- 40x30 degree field of view
- Long-range super- sensitive microbolometer sensor
 - **Early uses include aviation applications**

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Microbolometer Schedule

MIILESTONES	FY98	FY99	FY00	FY01
Readout Circuit Design				
Thermal Detector Design				
Focal Plane Array Fab				
Package Development				
Electrical Design/Fab				
Op tics Design				
Integration and Test				
Reports	X	X	X	X
Sensor Delivery	X			X

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Deliverables and ROI

- 3 Microbolometer sensors for application in Army ground vehicles
- Unit cost little as 1/5 of traditional tracked vehicle mounted systems (\$7000-\$10K).
- With additional development of electronics and optics, price of device could be reduced to the \$2000-\$5000.

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Microbolometer Application and Video



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